



## I. Summary of Information

Influenza has now been reported from at least 196 counties in the United States. Many of the outbreaks have been limited to school and colleges, but at least 16 counties in California, Oregon, Arizona, Utah, Mississippi, Louisiana, and New York appear to have experienced community-wide epidemics. Attack rates are variable but continue to be roughly between 20 and 30% of involved school groups. In some areas where detailed epidemiologic investigations have been made, school and community-wide outbreaks appear to have occurred simultaneously. This, however, cannot be said for all areas which have experienced school outbreaks to date.

Henceforth, because of the large number of new outbreaks each week, influenza information will be presented in map and tabular form. Interesting and unusual epidemic and case reports will be published in detail as before.

Influenza encephalitis has been diagnosed in a 6-week-old infant from Mississippi. The clinical picture of convulsions, apnea, and muscle twitching plus recent influenza in four family members tend to confirm this diagnosis.

A second serologic confirmation of type B influenza, since the appearance of Asian strain influenza in the United States, was made this week in Portland, Oregon. Twenty-four other influenza isolations in Oregon to date, however, have been Asian strain.

Cities in the West South Central Division (Louisiana, Arkansas, Oklahoma, and Texas) again reported a number of deaths due to influenza and pneumonia somewhat above expectancy. This increase came largely from Louisiana cities.

Two more deaths associated with influenza have been reported from California. One of these deaths, occurring in a 23-year-old male, appears to be due to uncomplicated influenza because of diffuse bilateral pneumonia and a slight lymphocytosis shortly before death. This makes a total of 18 influenza associated deaths in the United States.

A total of 10,669,091 ml of Asian flu vaccine has been released to date. This includes 3,712,059 ml released since September 18.

Careful studies continue to show a low incidence of significant reactions with 200 cca or less of vaccine in adults. The use of 500 cca units caused a significant increase in reactions in prison volunteers.

Appended to this report is a discussion of the use of monkey kidney tissue cultures in laboratory diagnostic procedures for influenza.

## II. Influenza Map and Tables

A new method of influenza reporting has been adopted for this Report. To date it has been possible to handle all reports of cases and outbreaks individually in this office. These reports have been presented as they have come to us in the first 18 Influenza Surveillance Reports. The volume of information flowing into the Influenza Surveillance Unit has markedly increased, however, in the past two weeks. Henceforth a map and a tabulation will provide the basic information on the occurrence of influenza in the continental United States. The individual reports will be omitted as a regular reporting procedure.

Outbreaks, sporadic cases, and community-wide epidemics of unusual interest will continue to be reported. The results of detailed epidemiologic investigations will also be reported. The summary will be expanded to include a general analysis of the influenza situation each week.

The map and the tabulation present data by counties. A black dot on the map represents a county in which at least one localized influenza outbreak or one confirmed Asian strain sporadic case has occurred. An entirely blackened county is one in which there is evidence of community spread of influenza. The criteria for defining community-wide epidemics have had to be somewhat arbitrary. We feel that a county can be said to have community-wide influenza if at least three schools in the county have had high absentee rates because of illness, or have been forced to close because of absenteeism. Supplemental criteria include: high industrial absenteeism; high influenza-like illness visit rates at hospitals (as in New Orleans); and the presence of influenza-like illness in special groups (such as military installations) within the county.

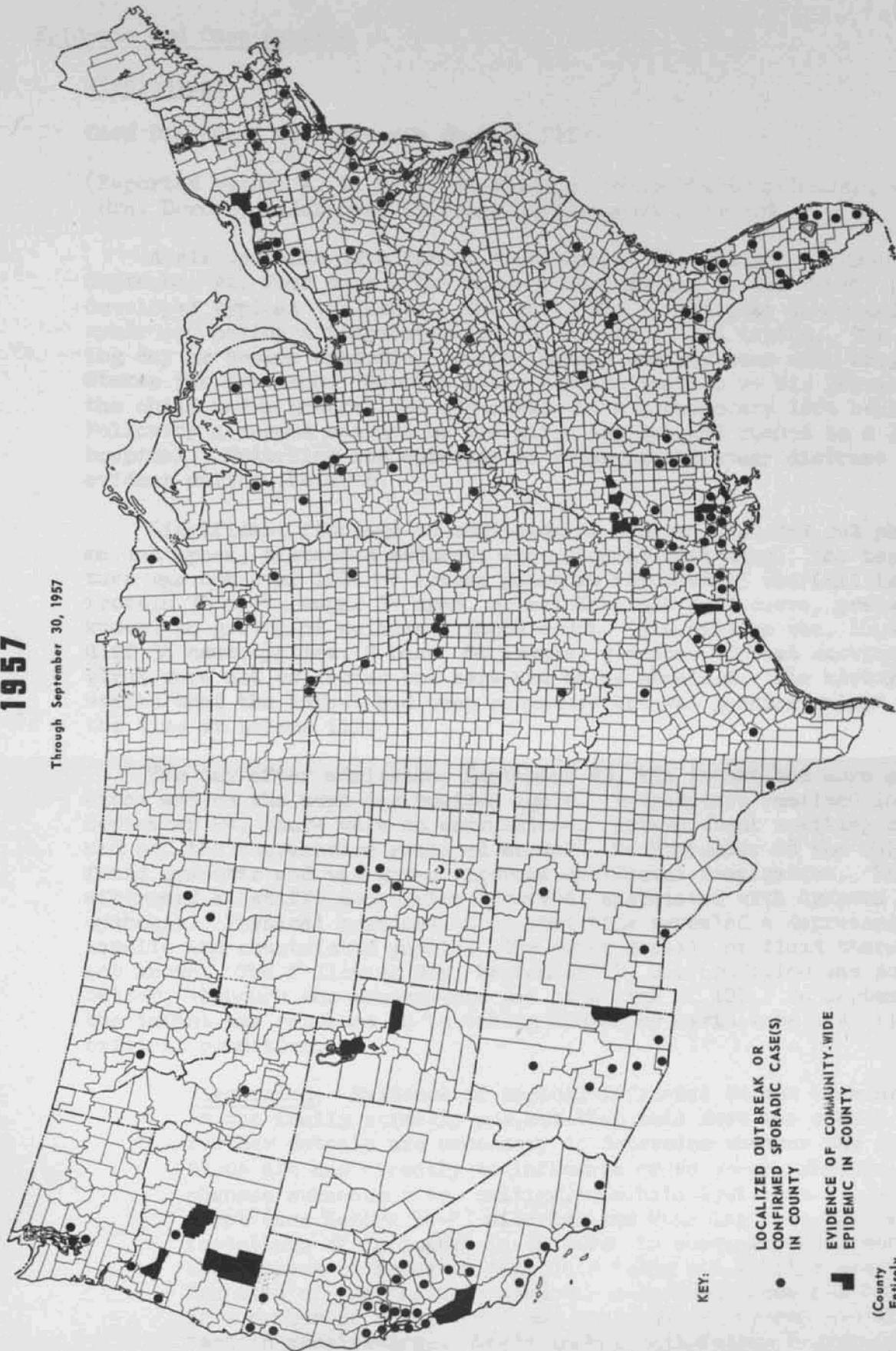
It is recognized that the initial tabulation is conservative. The new county reporting system will undoubtedly fill in many gaps in our present information. Considerable thought has been given to the question whether or not total numbers of suspect Asian strain influenza cases should be listed for each state. For the present such a listing has been omitted because it is felt that our information on this point would not provide a very meaningful tabulation.

Tabulation of Influenza Outbreaks, Confirmed Sporadic Cases,  
and Epidemics in the Continental United States  
June through September 30, 1957

State	No. counties in state	No. counties reporting	
		Localized outbreaks or confirmed sporadic cases	Community-wide epidemics
Alabama	67	2	0
Arizona	14	6	1
Arkansas	75	1	0
California	58	27	1
Colorado	63	6	0
Connecticut	8	2	0
Delaware	3	—	
D. C.	—	—	
Florida	67	16	0
Georgia	159	5	0
Idaho	14	1	0
Illinois	102	5	0
Indiana	92	3	0
Iowa	99	1	0
Kansas	105	3	0
Kentucky	120	3	0
Louisiana	64	16	2
Maine	16	—	
Maryland	23	3	0
Massachusetts	14	1	0
Michigan	83	5	0
Minnesota	87	6	0
Mississippi	82	6	3
Missouri	114	3	0
Montana	56	4	0
Nebraska	93	1	0
Nevada	17	Sporadic confirmed cases - counties not known	
New Hampshire	10	—	
New Jersey	21	2	0
New Mexico	32	2	0
New York	62	14	2
North Carolina	100	—	
North Dakota	53	—	
Ohio	88	4	0
Oklahoma	77	1	0
Oregon	36	3	3
Pennsylvania	67	5	0
Rhode Island	5	1	0
South Carolina	46	2	0
South Dakota	68	2	0
Tennessee	95	Sporadic confirmed cases - counties not known	
Texas	254	10	1
Utah	29	0	3
Vermont	14	1	0
Virginia	98	2	0
Washington	39	3	0
West Virginia	55	Sporadic confirmed cases - counties not known	
Wisconsin	71	2	0
Wyoming	23	1	0
Totals:	3068	181	16

# ASIAN STRAIN INFLUENZA 1957

Through September 30, 1957



KEY:

● LOCALIZED OUTBREAK OR  
CONFIRMED SPORADIC CASE(S)  
IN COUNTY

■ EVIDENCE OF COMMUNITY-WIDE  
EPIDEMIC IN COUNTY

(County  
Entirely  
Black)

### III. Epidemic and Case Reports

#### 1. Mississippi

##### Case Diagnosed as Influenza Encephalitis

(Reported by Dr. A. L. Gray, Mississippi State Board of Health, and Mrs. Dorothy Calafiore, Epidemic Intelligence Service)

A six-week-old male infant from Eupora, Mississippi, became ill on September 21, four days after three other members of the family had developed typical influenza. The child did not display the usual flu syndrome, having a temperature of 99, anorexia, and crying. The following day he became cyanotic, vomited twice, and was seen with Cheyne-Stokes respirations. Shortly after hospitalization by his physician, the child had a generalized convulsion with a temporary left hemiparesis. Following a second seizure he was given Luminal and rushed to a Jackson hospital. Twitching and episodes of severe respiratory distress were evident during the trip.

Significant findings on admission at Jackson included red pharynx, marked apnea, distended abdomen, and muscular twitching. The temperature was not over 100. A lumbar puncture revealed 15 wbc (all lymphs), protein 76 mgm%, sugar 74 mgm%, normal Kahn and gold curve, pressure not known, no growth of culture. Blood count: 3.6 million rbc, 16,400 wbc diff 34 neutrophiles, 2 baso, 61 lymphs, 3 monos. Throat washings for virus were not collected but sera are being obtained. The history revealed that the infant had been premature but was gaining weight well at the time it became ill.

The day after admission, September 23, the infant had more convulsions and on the next day vomited again. Temperature remained low. On September 24, there were no convulsions. Intermittent vomiting continued and the temperature remained normal. On September 28 the child was found cyanotic and was given vigorous artificial respiration. Shortly afterward a "stiff" convulsion occurred, associated with dyspnea and cyanosis. Physical examination at that time revealed a depressed fontanelle and constricted pupils. The exact details of fluid therapy are not known. The following day, September 29, his condition was somewhat better, although the temperature was at a high of 101. On September 30 the infant was reported to be taking fluids by Levin tube and still in critical condition.

Discussion: Evidence of typical influenza in the community and in the family strongly suggest that this case was caused by flu. Further details are necessary to determine whether the convulsions are due directly to influenza or to severe electrolyte changes subsequent to vomiting. In both Louisiana and Mississippi (see Report 14-F) diarrhea and vomiting were frequent manifestations of influenza in children in community-wide outbreaks. The absence of fever in this case rules out febrile convulsions. The type of encephalitic syndrome described above has been noted in a number of acute viral and bacterial diseases, and after certain vaccinations. Scott in Mitchell-Nelson Pediatrics, 1951, discusses this entire problem briefly. Comments or further examples of this sort are invited.

2. Oregon

(Reported by Dr. S. B. Osgood, Oregon State Board of Health)

A serologic confirmation of influenza type B has been made in Portland, Oregon, from a sporadic case within the past week. This is only the second type B confirmation since the appearance of Asian strain influenza in the United States. The Oregon State Laboratory has reported 24 serologic confirmations of Asian strain influenza to date.

Oregon is experiencing epidemic influenza at present in many areas. At least three counties appear to have widespread community epidemics and many other counties have at least one or two schools or colleges with marked absenteeism.

<u>OREGON Weekly Influenza Morbidity</u>			<u>Weekly Pneumonia Morbidity</u>	
Week	1956	1957	1956	1957
31	40	94	--	--
32	23	130	10	22
33	58	140	13	7
34	64	180	10	14
35	64	245	11	3
36	47	239	11	22
37	62	375	12	35
38	84	818	7	25

3. Louisiana

Report from Charity Hospital, New Orleans

(Data provided by Hospital Staff and Dr. J. D. Martin, La. Dept. of Health)

Patients seen in the Admitting Room and the number with influenza-like illness.

Week Ending	NEGRO			WHITE		
	Total Patients Seen	Flu-Like Illness	% of Total	Total Patients Seen	Flu-Like Illness	% of Total
Aug. 10	2724	206	7.5	882	19	2.1
Aug. 17	2850	391	13.6	850	38	4.5
Aug. 24	3330	918	27.4	967	130	13.5
Aug. 31	5641	1479	26.0	1489	206	13.7
Sept. 7	5033	1414	28.0	1385	207	14.9
Sept. 14	4427	1123	25.2	1480	154	10.4
Sept. 21	4738	968	20.4	1600	228	14.2

IV. Current Analysis of Influenza and Pneumonia Mortality\*

Table I

Current Influenza and Pneumonia Deaths  
in 108 United States Cities

Division	Number of Cities		Deaths (including estimates***) during weeks ending		
	In Study	Reporting this week	Sept. 14 (108 cities)	Sept. 21 (108 cities)	Sept. 28 (105 cities)
All Divisions	108	105	263	306	262
New England	14	12	13	21	20
Mid. Atlantic	17	17	74	87	69
E. North Central	18	18	55	61	50
W. North Central	9	9	20	19	18
S. Atlantic	9	9	16	22	19
E. South Central	8	8	24	15	12
W. South Central	13	13	27	36	41
Mountain	8	8	7	9	9
Pacific	12	11	27	36	24

\*\*The number of deaths given includes estimates for cities not reporting in a given week. The table is corrected for preceeding weeks as late figures are received. The chart will be corrected only for gross discrepancies.

Comment

Generally, the number of influenza and pneumonia deaths remained stable. The West South Central Division, however, again reported a number of deaths somewhat above seasonal expectancy. Within this Division, cities in Texas generally had lower numbers than in the preceeding week; in Arkansas and Oklahoma cities little change was noticeable. Louisiana cities showed slight increases. Pneumonia and influenza deaths by State within this Division are given in the following table:

	Week Ending		
	Sept. 14	Sept. 21	Sept. 28
Texas (7 cities)	14	26	19
Arkansas (Little Rock)	3	2	4
Oklahoma (2 cities)	1	0	2
Louisiana			
Baton Rouge	1	1	1
New Orleans	6	4	10
Shreveport	2	3	5
Division Total	27	36	41

\*Prepared by Dr. Robert Serfling, with the assistance of Mrs. Ida Sherman, Mr. Arthur Cohen, and Mr. Paul Leaverton, Statistics Section, CDC.

V. DEATHS - Deaths Specifically Associated with Influenza

New Reports

Two additional California deaths associated with influenza-like illness have been reported by Drs. A. C. Hollister and R. M. Moldenhauer, California Department of Public Health.

Cal. 12 On September 14, a three-year-old Oakland female died of "pneumonia and pulmonary edema" following an influenzal-like illness. Further details are not available at present.

Cal. 13 A 23-year-old male died in the Los Angeles area on July 28 of an illness considered to be influenzal pneumonia. At the time the man, who had been in good health, was at a children's camp which experienced a high attack rate of febrile respiratory disease. He became ill July 24, with headache, high fever, and myalgia. A few rales were noted the next day, and severe chest pain appeared soon thereafter. On July 28 the young man expired. An X-ray before death revealed diffuse bilateral bronchopneumonia. A slight lymphocytosis was noted. An autopsy was not performed.

Alaska Dr. H. V. Gibson, of the Alaska Department of Health, has reported that Nome, Alaska, experienced an influenza epidemic during September. Of a population of 1876, 500 were ill and, of these 500, two died--one infant and one elderly person. Details of these deaths have not yet been obtained.

VI. Influenza Vaccine Production and Distribution

Influenza Vaccine Released  
(Totals through September 25, 1957)

<u>Pharmaceutical Concern</u>	<u>Monovalent Asian strain</u>	<u>Polyvalent with Asian strain</u>
Lederle	2,671,460 ml.	473,280 ml.
Lilly	597,375	16,335
Merck, Sharpe & Dohme	1,775,140	
National Drug	2,187,570	2,052,435
Parke Davis	99,250	
Pitman Moore	796,246	

Total released to date: 10,669,091 ml.  
Amount released since September 18: 3,712,059 ml.

Shipping Destination:

Department of Defense 3,599,670 ml.  
Commercial channels 7,069,421 ml.

Estimated Vaccine Production:

September 12,200,000 cc.  
October 24,500,000 cc.  
November 34,500,000 cc.

VII. Miscellany

1. Influenza in Pigs, Manchuria

(Reported by Dr. A. M.-M. Payne, Unisante, Geneva)

An Asian strain influenza virus was isolated from a pneumonic patch in a pig's lung in Manchuria last June. This was revealed in a report by Professor Spooner on a visit to Dr. Chu in Changchum, China. There was an epidemic of influenza in pigs in mid-March in Manchuria.

2. Reactions to Influenza Immunization

The following study was conducted at Mt. St. Mary's Hospital in Niagara Falls, New York, under direction of Dr. Victor Pellicano, Chief of Staff.

Two hundred ninety-eight hospital personnel were vaccinated subcutaneously with 1.0 ml. of monovalent Asian strain vaccine. Reactions were as follows:

<u>Local</u>	<u>Number</u>	<u>%</u>	<u>Systemic</u>	<u>Number</u>	<u>%</u>
Redness	196	66	Malaise	23	7.7
Pain	192	64	Headache	22	7.4
Swelling	150	50	Nausea	15	5.0
			Vertigo	12	4.0
			Fever	11	3.7
			Diarrhea	9	3.0

Although local reactions were frequent, none were of consequence. No person was incapacitated by systemic reaction. Care had been taken to avoid vaccination of egg-allergic persons in this particular study.

3. Atlanta Federal Penitentiary Influenza Vaccine Study

(Reported by Dr. Bruce Dull, EIS Officer, and Mr. Arthur Cohen, EIS, Statistics Section, CDC)

VACCINE REACTIONS

	Vaccine Preparations CCA units/cc				
	0	50	200	500	Total
Number reporting reactions	16	6	7	38	67
Number with fever over 100 degrees	0	0	2	12	14
Total number vaccinated	311	311	311	311	1244

Of the recorded symptoms, the most frequently listed were myalgia, feverishness-chilliness, headache, malaise, nausea with occasional vomiting, and possible allergic reactions including urticaria (one case), anaphylactic-like state (one case), and a stomatitis (one case). The usual therapy was APC or other salicylate compound; the more severe reactions were given antihistamines; epinephrine was used in the anaphylactic-like state.

Two inmates were hospitalized with vaccine reactions: both of them had received the 500 CCA/cc vaccine; one remained in the hospital for three days--noting symptoms of myalgia and severe headache, temperature to 100 degrees. The other was hospitalized for five days with symptoms of myalgia, fever, and chills and malaise; temperature maximum 103.8 degrees.

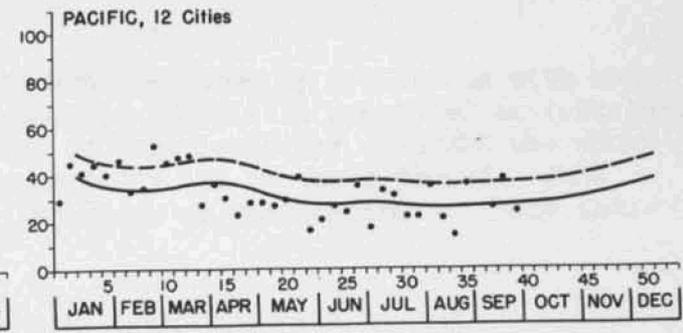
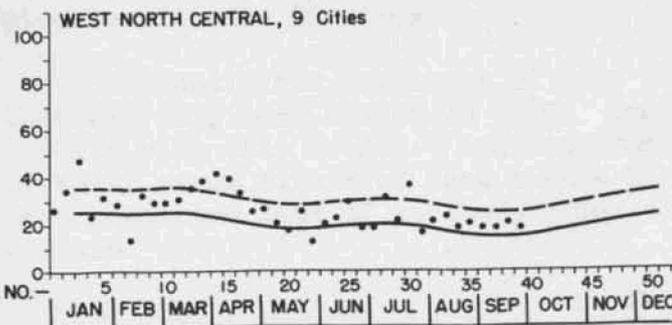
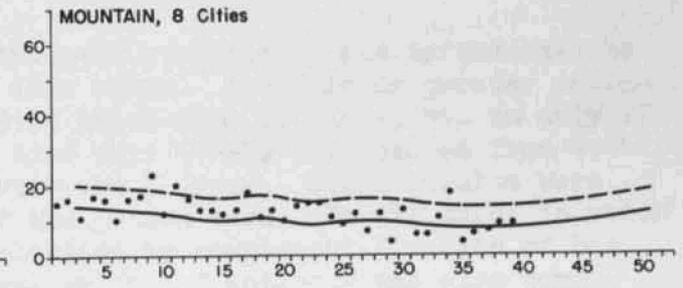
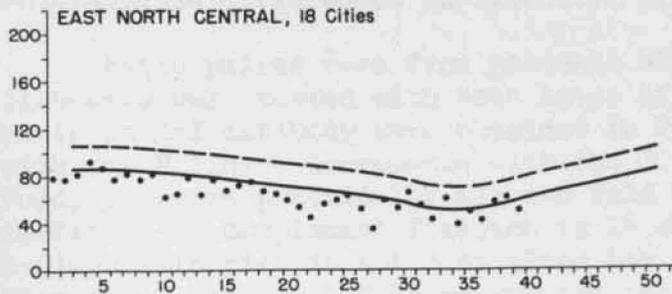
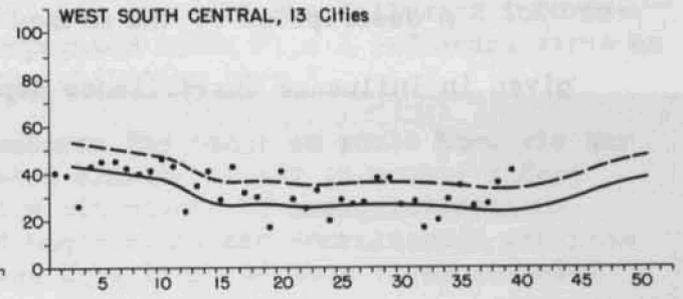
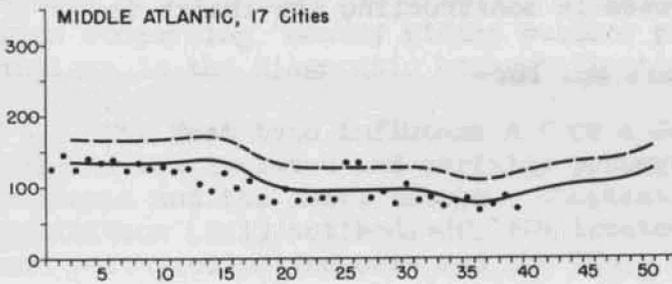
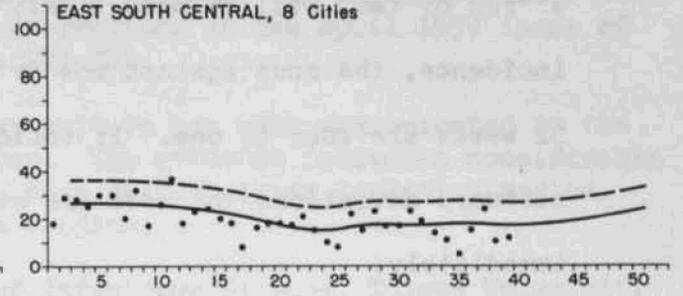
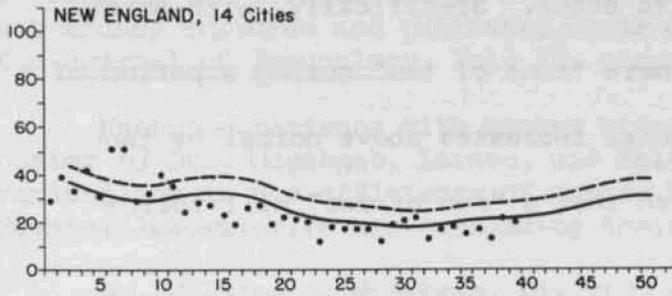
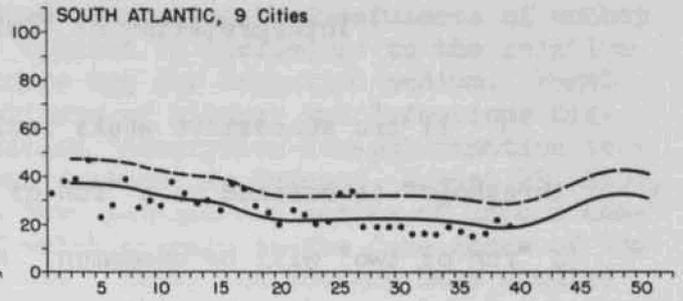
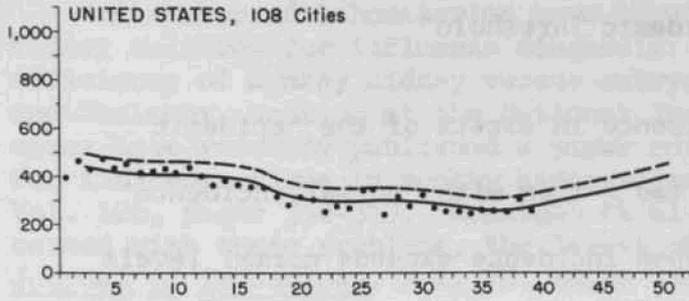
The above data are based on reactions reported either in the regular penitentiary Sick Call or on an emergency basis and do not reflect, perhaps, the total number of unreported minor reactions. Each group included 311 vaccinated volunteers.

Considering two sided alternatives and a significance level of 0.05, tabled chi-square value is 5.02, the tests showed that the proportion of reactors in the "500" group was greater than that in any other group. No other pairwise comparison proved statistically significant.

# WEEKLY PNEUMONIA AND INFLUENZA DEATHS

 "EPIDEMIC THRESHOLD"  
 "NORMAL INCIDENCE"

(SEE EXPLANATION ON BACK OF SHEET)



WK. NO. | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC

JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC

### Interpretation of "Epidemic Threshold"

If two successive weeks incidence in excess of the "epidemic threshold" is defined as a "run of two", then with "normal incidence" a "run of two" will be uncommon. When incidence exceeds normal levels a "run of two" will be more likely to occur. Specifically, with normal incidence, the odds against one or more "runs of two" during a period of 52 weeks are four to one. If incidence increases above normal by two standard deviations the odds are even that a "run of two" will follow immediately.

A description of the method used in constructing the charts is given in Influenza Surveillance Report No. 16.

USE OF MONKEY KIDNEY TISSUE CULTURE IN DIAGNOSTIC PROCEDURES FOR INFLUENZA  
By Keith E. Jensen, Ph. D.

A number of laboratories have inquired concerning the usefulness of monkey kidney cultures for influenza diagnosis. Opinion is divided as to the relative efficiency of monkey kidney versus embryonate egg for isolation medium. Vogel and Shelokov, working at the National Institute of Allergy and Infectious Diseases have recently published a paper entitled "Adsorption-hemagglutination test for influenza virus in monkey kidney tissue culture" in Science, August 23, 1957, Vol. 126, pages 358-359. Mogabgab et al. have published a series of papers concerned with these problems, the latest of which appears in the June issue of the Journal of Immunology, Vol. 78, pages 456-464. Henry and Younger have studied several of the problems to be met when influenza viruses are inoculated into monkey kidney cultures and published their observations in the April 1957 issue of the Journal of Immunology, Vol. 78, pages 273-281.

Recent experience with monkey kidney culture has been communicated to the Center by Drs. Mogabgab, Larson, and Kalter. The evidence indicates considerable variability in the efficiency of monkey kidney culture as an isolation medium. Several laboratories are continuing these studies.

Dr. William J. Mogabgab, Division of Infectious Disease, Tulane University School of Medicine, New Orleans, Louisiana, has provided the following information concerning "Monkey kidney culture propagated Asian Type A influenza virus as antigen in the diagnostic hemagglutination-inhibition test."

Far East type influenza A from a Jamboree Boy Scout en route home via New Orleans was isolated and serially propagated simultaneously in monkey kidney cultures and the chick embryo. Comparative titrations of hemagglutination-inhibition (HaI) antibody with RDE treated human acute and convalescent and pre- and post-vaccination sera and the TC<sub>2-4</sub> and E<sub>3-5</sub> lines of this virus revealed considerable differences in titers.

Fifty paired sera from patients with upper respiratory and influenza-like illnesses were tested with both lines of this virus. Fourfold or greater increments in HaI antibody were obtained in 29 of these with TC virus, but in only 17 with the E line. Increments with the TC line were evenly distributed from 4-64 fold, but were practically all 4-8 fold with the E virus. These results were confirmed by complement-fixation in 14 of the paired sera. In all cases in which a diagnostic rise in antibody titer was obtained by complement-fixation of HaI with the E line, a 4-fold or greater increment in HaI antibody was also demonstrable with the TC virus.

Necessity for treatment of sera with RDE was shown by titrations with sera that had only been heated to 56°C. Non-specific inhibition precluded satisfactory results with this method. Adequate removal of this inhibitor with RDE was shown by acute serum titers of less than 4 in practically all of those tested. This also suggested lack of antibody prior to infection or vaccination in these individuals.

Similar results were obtained in post-vaccination human sera in which hemagglutination-inhibition antibody titers were 2-4 fold or greater with the TC line than the E virus in most instances.

Hemagglutinating virus was prepared in monkey kidney cultures grown in eight 32 oz. prescription bottles for one week. After three washings Mixture 199 was replaced as maintenance solution and virus was inoculated. Maximum titers were obtained in three days and were usually 1-64 to 1-256 with a final concentration of 0.25% human type O RBC. Cytopathogenic effect, quite marked with this virus, was a useful index of virus growth. Sodium bicarbonate was used to maintain pH between 7.2 - 7.6. When pH rose to undesirable levels in the harvested fluids, gaseous CO<sub>2</sub> was used to lower it prior to freezing.

Monkey kidney cultures have also been found suitable for isolation of Far East type influenza A. Tissue culture fluids were replaced 3 days after inoculation and hemagglutinins were present 3 days later. Mixture 199 without serum was used since it had been found superior to other media with or without animal sera for growth of influenza viruses. It is likely that isolation time may be shortened by earlier change in fluids, but this procedure has been considered important in removal of inhibitory substances present in throat washings.

Thus, laboratories in which monkey kidney cultures are used routinely may readily take part in studies on influenza epidemics without conversion of basic procedures. This system also will lend itself to investigations of characteristics of the virus. Titrations of infectivity and neutralizing antibody may be carried out by the usual procedures. Virus growth can be detected by addition of 0.5 ml of 1% human type O erythrocytes to each tube and hemagglutination patterns may be read after 1.5 hours at 4°C.

Dr. E. H. Lennette, California State Department of Public Health, has reported continued use of the A/Spirup/48 strain in complement-fixation tests. Satisfactory results have been obtained for many years by that laboratory using this strain which is apparently rich in soluble antigen. The diagnosis of Type A infections can be made in this manner. It is necessary, however, to use an Asian strain (such as A/Japan/305/57) in hemagglutination-inhibition tests when the more specific information is required.